

**Remarks/Arguments**

Favorable consideration of this application in light of the following discussion is respectfully requested.

Claims 3, 4, and 11 are pending in the application.

In the outstanding Office Action, Claims 3-4 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee et al. (U.S. Patent No. 6,288,493) in view of Holland et al. (U.S. Patent No. 5,800,619); and Claims 3-4 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee et al. (U.S. Patent No. 6,288,493) in view of Hemker et al. (U.S. et al. (U.S. Publication No. 2004/0011467, hereinafter Hemker).

Applicants respectfully request that the finality of the present rejection be withdrawn. As noted in the Official Action, Applicants have overcome the previously pending rejections under 35 U.S.C. § 103(a) in view of Ishii and Holland. In view of the similarity of the previous rejections and the acknowledgements in the Official Action, Applicants submit that the pending rejections under 35 U.S.C. § 103(a) in view of Lee and Holland have therefore also been overcome. Applicants also submit that the rejections in view of Lee and Hemker are new grounds for rejection and, therefore, should result in the issuance of a non-final rejection.

Applicants request that formal acknowledgement of their IDS of April 28, 2004.

Applicants acknowledge with appreciation the personal interview between the Examiner and Applicants' representative on July 21, 2004. During the interview, the Holland and Hemker references were reviewed in view of Applicants' claimed third coil "configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted." The Examiner suggested Applicants' identify support in the specification for varying mutual inductances by adjusting the coil's vertical displacement from the other coils.

Briefly recapitulating, Claim 3 is directed to a power supply antenna, comprising: at least two coils disposed concentrically. The at least two coils comprise a plurality of

conductors bent into a form of an arc, and power supply portions formed at opposite ends of the respective coils so as to be connected to a high frequency power source. The power supply portions are located in different phases on a common plane. The power supply antenna also includes another coil disposed on a plane parallel to the common plane and configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted. By placing another coil in a plane parallel to the common plane that contains the at least two coils located in the common plane, heating distribution of the plasma can be shaped to achieve a uniform absorption distribution and/or intensification.<sup>1</sup>

Lee discloses an antenna device with three coaxial coil antennas disposed in a common plane.<sup>2</sup> However, as noted in the Official Action, Lee does not disclose or suggest a third coil disposed on a plane parallel to at least two coaxial coils on a common plane, as recited in Applicants' Claims 3 and 11.

Holland discloses an "electric source [including a] substantially planar coil 24, usually mounted immediately above window 19"<sup>3</sup> and alternative embodiments that include "positioning the coils... in many different planes above window 19."<sup>4</sup> However, Holland does not disclose or suggest that "at least one of the coils is disposed on a plane parallel to the same plane" as recited in Applicants' Claims 3 and 11. In Holland, no reference is made to parallel or non-parallel planes.

Holland also does not disclose that the coil on the different plane "is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted" as recited in Applicants' Claim 3. In Applicants' invention, the respective coils are arranged parallel to one another, where the vertical distance L between the coils can be adjusted to vary mutual

---

<sup>1</sup> Specification, page 26, lines 13-20.

<sup>2</sup> Lee, Figure 5.

<sup>3</sup> Holland, column 7, lines 2-8.

inductances so that the distribution of energy absorbed to the plasma is adjusted. By being able to vary mutual inductances (by adjusting a distance L between the coils), an optimum energy distribution can be obtained in an improved and easy-to-control manner. In Holland, the distance between the coils is fixed and therefore is not configured to vary mutual inductances as recited in Applicants' claimed inventions. That is, antenna coils are generally made of a hard material, such as a copper pipe. Thus, once the antenna coil is produced, it is virtually impossible to change its physical characteristics (e.g., diameter). However, with the claimed invention, desired adjustments can be made by changing the height position of a predetermined coil. In contrast, conventional systems like Holland are unable to vary mutual inductances.

Thus, Applicants submit that neither Lee nor Holland disclose or suggest all the elements recited in Applicants' claimed inventions. Thus, Applicants request the rejection of Claims 3 and 11, and all claims depending therefrom, in view of Lee and Holland be withdrawn.

In addition, Applicants note that Holland discloses that an antenna structure that generates a non-uniform component is generated in the plasma within the chamber 10 mounted in a direction parallel to the dielectric window 19.<sup>5</sup> Thus, Holland states that the most uniform plasma is generated when the inclination angle between the coil plane and the window 19 is set at about 9 to 18 degrees.<sup>6</sup> However, with Applicants' claimed "at least one of the coils...disposed on a plane parallel to the same plane," the non-uniform component of Holland is not generated. Thus, with Applicants' claimed invention, there is no need to provide a coil inclination to maintain plasma stability. Because of this reason, Applicants submit that Holland teaches away from Applicants' claimed invention. Thus, for another reason

---

<sup>4</sup> Holland, column 14, lines 11-24.

<sup>5</sup> Holland, column 13, lines 10-20

<sup>6</sup> Holland, column 13, lines 21-45; Figure 10.

Applicants request the rejection of Claims 3 and 11, and all claims depending therefrom, in view of Lee and Holland be withdrawn.

Hemker discloses an RF antenna having a cylindrical plasma chamber 106 which is a 3-D, stacked configuration employed to promote azimuthally symmetric coupling.<sup>7</sup> However, like Lee and Holland, Hemker fails to disclose or suggest “another coil disposed on a plane parallel to the common plane and *configured to vary* mutual inductances” as recited in Claims 3 and 11. That is, like Lee and Holland, the coils of Hemker are not vertically adjustable as in Applicants’ claimed invention. In Hemker, the coils are stationary and, thus, are not configured to *vary* mutual inductances. Furthermore, inductances between the coils are adjusted by varying the DC current to the electromagnetic coils 104.<sup>8</sup>

As noted in the Official Action, the combination of Lee and Hemker, as well as Lee and Holland, fail to disclose or suggest equal spacing between adjacent power supply portions as recited in Applicants’ Claim 4. Applicants submit that the assertion in the Official Action that it would have been obvious to modify Hemker and Lee, or Holland and Lee, to create an antenna with equal spacing is an impermissible hindsight reconstruction of Applicants’ claimed inventions.

Because none of the cited prior art, individually or in combination, disclose or suggest all the elements of independent Claims 1 and 11, Applicants submit the inventions defined by Claims 1 and 11, and all claims depending therefrom, are not rendered obvious by the asserted prior art for at least the reasons stated above.<sup>9</sup>

---

<sup>7</sup> Hemker, paragraph [0051]; [0058]; Figure 1.

<sup>8</sup> Hemker, paragraph [0054].

<sup>9</sup> MPEP § 2142 “...the prior art reference (or references when combined) must disclose or suggest **all** the claim limitations. The disclosing or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).”

Accordingly, in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Gregory J. Maier  
Attorney of Record  
Registration No. 25,599  
Michael E. Monaco  
Registration No. 52,041

Customer Number

**22850**

Tel.: (703) 413-3000  
Fax: (703) 413-2220  
GJM/MEM/kkn

I:\atty\Mm\AMENDMENT\231828\209667.resp due Sept. 23..doc